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a side. In western Java  $S = 50$  km. There are more earthquakes in this region. It will not be without interest to quote a few of the author's conclusions expressed in this numerical form.

For Porto Rico,  $S = 2.3$  km., that is, there is one earthquake annually in each square of 2.3 km. (1.38 miles) on a side on the average.

For the island of Luzon,  $S = 2.8$  km.; for Manila,  $S = 3.0$  km.; for central Cuba,  $S = 41$  km.; for western Cuba,  $S = 128$  km.; for Hawaii,  $S = 37$  km. These numbers may be compared with others relating to the United States, as central California,  $S = 76$  km.; New England,  $S = 90$  km.; the Carolinas,  $S = 313$  km.; Michigan,  $S = 487$  km., or with Tokyo, Japan—one of the most disturbed portions of the globe—for which the number is 12 km. Manila and Porto Rico are far more disturbed than this.

Work of the kind here noticed is valuable in proportion to the care with which the data have been sifted, and to the impartiality of the investigator. It is believed that anyone who will examine the work of M. Montessus carefully will conclude that he has made a considerable step forward.

EDWARD S. HOLDEN.

STOCKBRIDGE, MASS.,  
August 15, 1898.

#### ZOOLOGICAL NOTES.

MR. FRANK FINN, of the Indian Museum, Calcutta, has been making an extensive series of experiments with birds in regard to the value of the so-called warning colors of butterflies. These experiments, which are recorded at length in the *Journal* of the Asiatic Society, are extremely valuable from the fact that while it has been assumed that insects nauseous to man are equally nauseous to birds this has not been sufficiently well proved. In fact, it has been shown by

the investigations of the Department of Agriculture that many of the (to us) vile-tasted Hemiptera are greedily devoured by birds. Definite information is also needed as to the extent to which birds actually eat butterflies. The experiments were mainly made with Babblers, *Crateropus*, and Bulbuls, *Otocampus*, although a few other species were used.

As a result of his experiments Mr. Finn concludes: "That there is a general appetite for butterflies among insectivorous birds, even though they are rarely seen when wild to attack them.

"That many, probably most, species dislike, if not intensely, at any rate in comparison with other butterflies, the 'warningly-colored' *Danainæ*, *Acræa violæ*, *Delias eucharis* and *Papilio aristolochiæ*, of these the last being the most distasteful, and the *Danainæ* the least so.

"That the mimics of these are at any rate relatively palatable, and that the mimicry is commonly effectual under natural conditions. That each bird has to acquire separately its experience, and well remembers what it has learned."

That, therefore, on the whole the theory of Wallace and Bates is supported by the facts and Professor Poulton's suggestion that animals may be forced by hunger to eat unpalatable forms is also more than confirmed.

F. A. LUCAS.

#### CURRENT NOTES ON ANTHROPOLOGY.

##### INDETERMINATE FORMS OF CHIPPED STONES.

THERE is a large class of objects which constantly puzzle the antiquary. These are flaked or chipped stones simulating the forms of art effects, yet not positively indicating the work of man.

In a handsome and abundantly illustrated volume of 70 pages M. A. Thieulen publishes a paper read before the Anthropological Society of Paris on a collection of

these objects from the drift of France. He claims that they represent the most common instruments of palæolithic man. They very rarely show distinct secondary chipping or the bulb of percussion; for which reasons his arguments do not seem to have convinced the Society; yet some of the specimens he figures might well pass as human handiwork. (*Les véritables Instruments usuels de l'âge de la Pierre*. Paris, Imprimerie Larousse, 1897.)

#### WAS BUDDHA A MONGOLIAN?

FERGUSON and others have claimed that the celebrated founder of Buddhism was of Mongolian origin. With an astonishing ignorance of ethnic traits, Fergusson supported this by the bold assertion that in India Buddha is always represented with wooly hair!

Professor E. W. Hopkins, of Yale, in his 'Notes from India' in the last (19th) volume of the 'Journal of the American Oriental Society,' takes occasion to report on this point. Many ancient figures of Buddha have the hair gathered up in little spiral, conch-shaped curls. According to tradition Buddha had curly hair and wore it short. From an examination of many statues it was evidently wavy, but never wooly. In some instances it is colored red. The general evidence is that so far as hair was concerned he preserved the type of the white race, and was equally remote from the Mongolian and the Negro.

#### MEXICAN ANTIQUITIES.

PROFESSOR FREDERICK STARR is preparing a 'Manual of Mexican Archæology,' which is sure to be a complete and valuable work, and one much needed at this time.

He anticipates portions of it in Vol. VII. of the 'Proceedings of the Davenport Academy of Natural Sciences,' by an article on 'Notched Bones from Mexico,' in which he explains those described by Dr. Lumholtz to be musical instruments (as I also did in

SCIENCE, May 27). Another article is on a shell inscription from Tula. It shows a fragment of *Haliotis* shell with four Mayan characters engraved upon it. This leads him to what he calls the 'startling' conclusion that there were trade relations between Tula, at the time of its occupancy, and the Mayan districts. But that fact is well known from Sahagun's 'History;' and the Tula, some forty miles north of Mexico, was surely not Tula the Magnificent, where Quetzalcoatl ruled his million of warriors!

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#### NOTES ON INORGANIC CHEMISTRY.

THE place of helium and argon in the periodic system has already caused much discussion, and now, that several other elements of similar nature have been discovered, the conjectures as to what to do with the whole group will be forthcoming doubtless in great profusion. Happily the *mélange* known as the Group VIII. in Mendeléef's table offers a refuge equal to almost any emergency that may arise. One element might exist in this group with an atomic weight somewhere from 1 to 7, another 19 to 23, another or even three between 36 and 39, three more between 80 and 85, three more between 128 and 132, to say nothing of possibilities of higher atomic weight. It is even possible that three elements could exist in place of each of the first two. From their position in the table, nothing could be foretold as to the properties of elements filling these places, save perhaps that their character would be neither positive nor negative (*i. e.*, without chemical affinity?) and that their valence would be zero (*i. e.*, forming no compounds?). These new elements, as far as they have been described, do singularly fulfil these conditions, helium falling into the first place, neon the second, argon and metargon the third and krypton the fourth. It is,